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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/087,152 | 03/01/2002 | Rene P. Helbing | 10004263-1 | 2625 |

7590 08/03/2006
AGILENT TECHNOLOGIES, INC.
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Loveland, CO 80537-0599

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| EXAMINER |
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TRAN, DZUNG D

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| ART UNIT | PAPER NUMBER |
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2613

DATE MAILED: 08/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/087,152

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| Applicant(s) |
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HELHING ET AL.

Examiner

Dzung D. Tran

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| Art Unit | |
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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If no period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 April 2006.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Specification

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claims 1, 2, 13, 20-21, 27 and 31 are rejected under 35 U.S.C. 102(a) as being anticipated by Giovanni et al. (hereinafter Giovanni) Cross-phase modulation suppressor for multi-span dispersion managed WDM transmission, ECOC'99, 26-30 September 1999, Nice, France.

Regarding claims 1 and 13, Giovanni discloses in Figures 3(a) and 4, an apparatus/method for spectral dispersion compensation in an optical communication network, comprising:

at least one optical fiber (e.g., fiber that connect to DCF of figure 4 or input fiber to the DEMUX of Fig. 3(a)) that carrying a light beam having different wavelengths (e.g., channel 1 to channel n), a portion of the signal on each wavelength (e.g. since the light beam is a multiplexed signal having wavelengths channel 1 to channel n, thus a portion of the light beam on each wavelength (e.g., channel 1 or channel 2, ... or channel n);

a **demultiplexer** (e.g., DEMUX of figure 3a) adapted to receive the plurality of wavelengths from the optical fiber (see Figures 3(a) and 4) and **divide** the plurality of

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wavelengths (e.g., channel 1 to channel n), into individual wavelength (e.g., channel 1 or channel 2, ... or channel n), the individual wavelengths relatively delayed by a respective dispersion compensation element, each dispersion compensation element having a different delay characteristic, see Figure 3(a), so that each wavelength relatively to reduce inter wavelength spectral dispersion and to synchronize each portion of the signal with respect to time across the plurality of wavelength (page I-205); and

a **multiplexer** (e.g., MUX of figure 3a) adapted to receive each wavelength (e.g., channel 1 or channel 2, ... or channel n) and **combine** the wavelengths onto the optical medium (see Figures 3(a) and 4).

Regarding claims 20 and 31, Giovanni discloses an apparatus/method for spectral dispersion compensation in an optical network, comprising:

means (e.g., fiber that connect to DCF of figure 4 or input fiber to the DEMUX of Fig. 3(a)) for supplying a signal distributed over a plurality of wavelengths to a demultiplexer (e.g., DEMUX of figure 3a);

means (e.g., e.g., DEMUX of figure 3a) for **dividing** the plurality of wavelengths into individual wavelengths (e.g., channel 1 or channel 2, ... or channel n);

means (e.g., the delay line that connected to the plurality of output channels) for simultaneously altering the relative timing of the wavelengths, each means having a different delay characteristic (see fig. 3(a)), to reduce inter-wavelength dispersion and to synchronize each portion of the signal with respect to time across the plurality of wavelength (page I-205); and

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means (e.g., MUX of figure 3a) for **combining** each wavelength or channel onto an optical medium.

Regarding claim 27, Giovanni discloses an apparatus/method for spectral dispersion compensation in an optical network, comprising:

a **demultiplexer** (e.g., e.g., DEMUX of figure 3a) for **dividing** the plurality of wavelengths into individual wavelengths (e.g., channel 1 or channel 2, ... or channel n);

the **delay line** that connected to the plurality of output channels for adjusting the relative timing of the wavelengths, each **delay line** having a different delay characteristic (see fig. 3(a)), to reduce inter-wavelength dispersion and to synchronize each portion of the signal with respect to time across the plurality of wavelength (page I-205); and

a **multiplexer** (e.g., MUX of figure 3a) for **combining** each wavelength or channel onto an optical medium.

Regarding claims 2, 21, Giovanni discloses in figure 3(a), the **delay line** that connected to the plurality of output channels for adjusting the relative timing of the wavelengths, each **delay line** having a different delay characteristic (see fig. 3(a)), to reduce inter-wavelength dispersion (page I-205).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

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such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 3-6 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Giovanni et al. (hereinafter Giovanni) Cross-phase modulation suppressor for multi-span dispersion managed WDM transmission, ECOC'99, 26-30 September 1999, Nice, France in view of Kashihara et al. US Patent no. 6,567,587.

Regarding claims 3 and 14, Giovanni does not specifically disclose the dispersion compensation or the delay line is a bragg grating. Kashihara discloses the dispersion compensation element 7b is a Bragg grating (col. 3, lines 29, 37).

It would have been obvious to an artisan at the time of the invention was made to replace the delay lines of Giovanni with the bragg grating taught by Kashihara in the apparatus of Giovanni. One of ordinary skill in the art would have been motivated to do this in order to reduce the wavelength dispersion per each wavelength. Thus, it improves cross-talk performance between the wavelengths of the WDM system.

Regarding claim 4, Kashihara discloses in col. 5, lines 3-4, the using of a fiber Bragg grating for dispersion compensation.

Regarding claim 5, Kashihara discloses in col. 4, lines 65-66, the dispersion compensation elements 7b is a waveguide Bragg grating.

Regarding claim 6, Kashihara discloses a multiplexer/demultiplexer 4, 5, 6 of figure 1 (equivalent to the multiplexer and the demultiplexer) are a surface diffraction grating (col. 2, lines 63-65).

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5. Claims 1-8, 10-16, 18-23, 25-29, 31-32 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kashiwara et al. US Patent no. 6,567,587 in view of Giovanni et al. (hereinafter Giovanni) Cross-phase modulation suppressor for multi-span dispersion managed WDM transmission, ECOC'99, 26-30 September 1999, Nice, France.

Regarding claims 1 and 13, Kashiwara discloses in Figures 1 and 2, an apparatus for spectral dispersion compensation in an optical communication network, comprising:

at least one optical fiber 15 of figure 2 that carrying a WDM signal (equivalent to optical medium having a signal distributed over a plurality of wavelengths), a portion of the signal on each wavelength (e.g. since the WDM signal is a multiplexed signal having wavelength $\lambda_1, \lambda_2 \dots \lambda_n$, see col. 3, lines 20-22, thus a portion of the WDM signal on each wavelength λ_1 or λ_2, \dots or λ_n);

a multiplexer/demultiplexer 4, 5, 6 of figure 1 having input waveguide 3 (col. 2, line 48) adapted to receive the plurality of wavelengths from the optical fiber 15 and divide the plurality of wavelengths into individual wavelengths $\lambda_1, \lambda_2 \dots \lambda_n$. Kashiwara discloses in figure 1, the Bragg gratings 7b connected to the plurality of output waveguides 7 for dispersion compensation each wavelengths $\lambda_1, \lambda_2 \dots \lambda_n$ (col. 4, lines 65-66), Kashiwara also discloses in col. 3, line 37 to col. 4, line 16 for adjusting the delay time of the Bragg grating to compensate for wavelength dispersion;

a **multiplexer/demultiplexer** 4, 5, 6 of figure 1 adapted to receive each wavelength $\lambda_1, \lambda_2 \dots \lambda_n$ and combine the wavelengths onto the waveguide 3 then output to optical medium 15.

Kashihara differs from claims 1 and 13 of the present invention in that Kashihara does not specifically disclose the individual wavelengths relatively delayed by a respective dispersion compensation element, each dispersion compensation element having a different delay characteristic, so that each wavelength relatively to reduce inter wavelength spectral dispersion and to synchronize each portion of the signal with respect to time across the plurality of wavelength. Giovanni discloses the individual wavelengths relatively delayed by a respective dispersion compensation element (e.g., different delay line), each dispersion compensation element or delay line having a different delay characteristic, see Figure 3(a), so that each wavelength relatively to reduce inter wavelength spectral dispersion and to synchronize each portion of the signal with respect to time across the plurality of wavelength (page I-205).

It would have been obvious to an artisan at the time of the invention was made to implement the teaching of Giovanni that is connect different delay line or dispersion compensation element to each channel wherein each dispersion compensation element having a different delay characteristic, so that each wavelength relatively to reduce inter wavelength spectral dispersion and to synchronize each portion of the signal with respect to time across the plurality of wavelength in the apparatus of Kashihara. One of ordinary skill in the art would have been motivated to do this in order to reduce the

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wavelength dispersion per each wavelength. Thus, it improves cross-talk performance between the wavelengths of the WDM system.

Regarding claims 20, 27 and 31, Kashihara discloses an apparatus/method for spectral dispersion compensation in an optical network, comprising:

an optical fiber 15 of figure 2 that carrying a WDM signal for supplying a signal distributed over a plurality of wavelengths to a multiplexer/demultiplexer 4, 5, 6 of figure 1 (equivalent to a demultiplexer);

a multiplexer/**demultiplexer** 4, 5, 6 of figure 1 (e.g., AWG multiplexer/demultiplexer) for dividing the plurality of wavelengths into individual wavelengths λ_1 or λ_2 , ... or λ_n ;

the **Bragg gratings** 7b connected to the plurality of output waveguides 7 for dispersion compensation each wavelengths λ_1 , λ_2 ... λ_n (col. 4, lines 65-66), Kashihara also discloses in col. 3, line 37 to col. 4, line 16 for adjusting the delay time of the Bragg grating to compensate for wavelength dispersion and for simultaneously altering the relative timing among the wavelengths;

a **multiplexer**/demultiplexer 4, 5, 6 of figure 1 for combining each wavelength onto an optical medium.

Kashihara differs from claims 20, 27 and 31 of the present invention in that Kashihara does not specifically disclose the individual wavelengths relatively delayed by a respective dispersion compensation element, each dispersion compensation element having a different delay characteristic, so that each wavelength relatively to reduce inter wavelength spectral dispersion and to synchronize each portion of the signal with

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respect to time across the plurality of wavelength. Giovanni discloses the individual wavelengths relatively delayed by a respective dispersion compensation element (e.g., different delay line), each dispersion compensation element or delay line having a different delay characteristic, see Figure 3(a), so that each wavelength relatively to reduce inter wavelength spectral dispersion and to synchronize each portion of the signal with respect to time across the plurality of wavelength (page I-205).

It would have been obvious to an artisan at the time of the invention was made to implement the teaching of Giovanni that is connect different delay line or dispersion compensation element to each channel wherein each dispersion compensation element having a different delay characteristic, so that each wavelength relatively to reduce inter wavelength spectral dispersion and to synchronize each portion of the signal with respect to time across the plurality of wavelength in the apparatus of Kashihara. One of ordinary skill in the art would have been motivated to do this in order to reduce the wavelength dispersion per each wavelength. Thus, it improves cross-talk performance between the wavelengths of the WDM system.

Regarding claims 2, 21, Giovanni discloses in figure 3(a), the **delay line** that connected to the plurality of output channels for adjusting the relative timing of the wavelengths, each **delay line** having a different delay characteristic (see fig. 3(a)), to reduce inter-wavelength dispersion (page I-205).

Regarding claims 3 and 14, Giovanni does not specifically disclose the dispersion compensation or the delay line is a bragg grating. Kashihara discloses the dispersion compensation element 7b is a Bragg grating (col. 3, lines 29, 37).

It would have been obvious to an artisan at the time of the invention was made to replace the delay lines of Giovanni with the bragg grating taught by Kashihara in the apparatus of Giovanni. One of ordinary skill in the art would have been motivated to do this in order to reduce the wavelength dispersion per each wavelength. Thus, it improves cross-talk performance between the wavelengths of the WDM system.

Regarding claim 4, Kashihara discloses in col. 5, lines 3-4, the using of a fiber Bragg grating for dispersion compensation.

Regarding claim 5, Kashihara discloses in col. 4, lines 65-66, the dispersion compensation elements 7b is a waveguide Bragg grating.

Regarding claim 6, Kashihara discloses a multiplexer/demultiplexer 4, 5, 6 of figure 1 (equivalent to the multiplexer and the demultiplexer) are a surface diffraction grating (col. 2, lines 63-65).

Regarding claims 7, 8, 12, 16 and 23, Kashihara discloses multiplexer/demultiplexer 4, 5, 6 of figure 1 (equivalent to the multiplexer and the demultiplexer) are an array waveguide (AWG) (col. 4, lines 19-21) and is a single element.

Regarding claims 10, 18 and 25, Kashihara discloses in Figure 2, a dispersion compensation element 1 located at an end point of the optical communication network.

Regarding claims 11, 19, 26 and 34, Kashihara discloses in figure 1, the Bragg gratings 7b connected to the plurality of output waveguides 7 for dispersion compensation each wavelengths $\lambda_1, \lambda_2 \dots \lambda_n$ (col. 4, lines 65-66), Kashihara also discloses in col. 3, line 37 to col. 4, line 16, for adjusting the delay time of the Bragg

grating to compensate for each wavelength dispersion. Thus it would be inherently that the dispersion compensation element correlates the optical signal on each wavelength with respect to time.

Regarding claims 15 and 22, Kashihara discloses multiplexer/demultiplexer 4, 5, 6 of figure 1 (equivalent to the multiplexer and the demultiplexer) are an array waveguide (AWG) (col. 4, lines 19-21) and the dispersion compensation elements 7b is a waveguide Bragg grating (col. 4, lines 65-66).

Regarding claims 28, 29 and 32, Kashihara further discloses the optical coupler 11 for coupling the incoming optical signal from a first optical fiber 13 to the demultiplexer (e.g., AWG 5) and for coupling the outgoing optical signal from the multiplexer (e.g., AWG 5) into a second optical fiber 14. Kashihara further discloses the optical coupler 11 is an optical circulator (figure 2, col. 5, line 17).

6. Claims 9, 17, 24, 30, 33 and 35-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kashihara et al. US Patent no. 6,567,587 in view of Giovanni et al. (hereinafter Giovanni) Cross-phase modulation suppressor for multi-span dispersion managed WDM transmission, ECOC'99, 26-30 September 1999, Nice, France and further in view of Richardson et al. US Patent no. 6,628,864.

Regarding claims 9, 17, 24, 30, 33 and 35, as per claims above, the combination of Kashihara and Giovanni discloses all the limitations except for the optical network is an optical code division multiple access (OCDMA) network. Richardson discloses the OCDMA optical network (figure 7) having OCDMA coder 275 and 260 (col. 11, lines 59-

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60), which generate the OCDMA code for modulating with an optical signal then transmit the OCDMA coded signal to the transmission link 300 (col. 11, lines 61-67). Since CDMA or CDMA for optical telecommunication (i.e. OCDMA) is well recognized in the art for spreading spectrum technique that permits a large number of separate users to share the same extended transmission bandwidth but to be individually addressable through the allocation of specific address codes (col. 1, lines 24-28 of Richardson), it would have been obvious to an artisan at the time of the invention was made to implement the teaching of Richardson that is encoding the OCDMA in the high speed and large capacity optical communication system of Kashihara and Giovanni. One of ordinary skill in the art would have been motivated to do this in order to improve cross-talk performance, asynchronous access and potential for improved system security (col. 1, lines 48-51 of Richardson).

Regarding claim 36, Kashihara discloses in figure 1, the Bragg gratings 7b connected to the plurality of output waveguides 7 for dispersion compensation each wavelengths $\lambda_1, \lambda_2 \dots \lambda_n$ (col. 4, lines 65-66), Kashihara also discloses in col. 3, line 37 to col. 4, line 16, for adjusting the delay time of the Bragg grating to compensate for each wavelength dispersion. Thus it would be inherently that the dispersion compensation element corrects dispersion within the encoded component.

Regarding claim 37, Kashihara discloses the dispersion compensation element 7b is a Bragg grating (col. 3, lines 29, 37).

Regarding claim 38, Kashiara discloses a multiplexer/demultiplexer 4, 5, 6 of figure 1 (equivalent to a multiplexer) serving as both the multiplexer means and the demultiplexer means.

Regarding claim 39, Kashiara discloses multiplexer/demultiplexer 4, 5, 6 of figure 1 (equivalent to the multiplexer) and the Bragg gratings are combined on a single optical substrate (figure 1, element 2).

Response to Arguments

7. Applicant's arguments with respect to claims 1-39 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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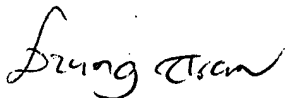
extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dzung Tran whose telephone number is (571) 272-3025.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's Supervisor, Jason Chan, can be reached on (571) 272-3022.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

A handwritten signature in cursive script, appearing to read 'Dzung Tran'.

Dzung Tran
06/22/2006